# STATEMENT OF WORK

## I. Introduction

The U.S. Environmental Protection Agency (EPA), Research Triangle Park, North Carolina is responsible for procuring, testing, and distributing filters of high purity to the State/local air pollution control agencies. The quartz filters are used with a size selective sampler (SSI) to collect PM-10 (particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers) samples. The glass fiber filters are used with a Total Suspended Particulate (TSP) sampler. This process assures filters with uniform characteristics and known quality assurance testing for the national particulate networks.

EPA obtains the filters each year from a contractor and has them shipped to EPA for acceptance testing. The filters for a specific year must be made from the same lot of raw materials for distribution to the States. If the acceptance testing confirms that the filters meet EPA's specifications for physical and chemical properties, the EPA distributes the filters to the State/local air pollution control agencies.

It is important that all filters of the same type from the same delivery contain a uniform level of impurities. Therefore, the contractor shall manufacture all filters for a delivery from the same sheet material using a single production line and one production run.

The glass fiber filters shall be numbered consecutively as follows:

| **Manufactured Year** | **For Use In filters** | **Beginning number** |
|---|---|---|
| CY-2005 | CY-2006 | G-6,000,001 |
| CY-2006 | CY-2007 | G-7,000,001 |
| CY-2007 | CY-2008 | G-8,000,001 |
| CY-2008 | CY-2009 | G-9,000,001 |

The quartz filters shall be numbered consecutively as follows:

| **Manufactured Year** | **For Use In filters** | **Beginning number** |
|---|---|---|
| CY-2005 | CY-2006 | Q-6,000,001 |
| CY-2006 | CY-2007 | Q-7,000,001 |
| CY-2007 | CY-2008 | Q-8,000,001 |
| CY-2008 | CY-2009 | Q-9,000,001 |

The Contractor shall deliver a Quality Assurance Project Plan (QAPP), Category IV within 2 weeks after award. The government will approve the QAPP within 2 weeks after receipt. The contractor shall not begin work until after approval.

## II. GLASS AND QUARTZ FILTER SPECIFICATIONS:

The filters shall be packed in sets of 65 filters, consecutively numbered, and placed in a cardboard box. Each set of 65 filters shall be placed between 8" X 10" pieces of non-contaminating cardboard when placed in the cardboard box, and each box of 65 filters shall be sealed in a clear, heat-shrink plastic covering. Non-contaminating is defined as not causing adjacent filters to fail to meet the specifications.

Each shipping container shall contain individual boxes of 65 filters, having the same reel number, roll number, and chemical and/or firing batch number, and shall be labeled on two opposite sides of the container along with the range (first and last) of individual consecutive filter numbers contained therein. Each shipping container shall contain not more than 32 boxes of 65 filters each. The exterior of each box of filters shall be marked with the box number (i.e., Box 1 [G6,000,001-G6,000,065]).

Both the quartz and glass fiber filters shall be numbered with permanent black ink with numbers approximately 1/4 inch high on the smooth (or screen) side and along the 8 inch edge. The numbers shall not extend beyond a distance of ½ inch from the edge of the filter.

The filters must meet the chemical and physical properties described below or EPA will reserve the right to reject them. An EPA contractor will test representative samples of the filters from each delivery to ensure that they meet the chemical and physical requirements noted below as applicable. The Contractor shall use the following test methods to check the filters.

- American Society of Testing Methods (ASTM) Method D645-92 (Standard Test Method for Thickness of Paper and Paperboard)

- Brittleness Test for Hi-Volume Glass Fiber Filters

- Tensile Tests for Hi-Vol Filters

- ASTM Method D828-93 (Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus with Attachment for Use on Hi-Vol Filters)

- Determination of Organic Content of Glass Fiber Filters (EMSL/RTP-SOP-QAD-522)

- EMSL/EPA/RTP Hi Vol Filter Flow Rate Acceptance Test for Quartz Filters for the SSI Samplers

- Atmospheric Research and Exposure Assessment Laboratory (AREAL) Visual Inspection Test for Quartz and Glass Fiber Filters

- ASTM Method D2986-91 (Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test

- Reference Method for the Determination of Lead in Suspended Particulate Matter Collected from Ambient Air (40 CFR, Part 50, Appendix G), or equivalent

Copies of these procedures are attached and are incorporated herein by reference. The EPA shall notify the contractor of its decision to accept or reject the filters within 90 days after receipt.

## III. Chemical and Physical Characteristics for Glass Fiber Filters

A. Physical Properties

315 filters from each batch of glass fiber filters, where a batch is defined as the filters to be used in one calendar year, shall be selected for acceptance testing by the physical and chemical test described below. All filters shall be subjected to the visual inspection tests and then a certain quantity (specified in chart) shall be subjected to the other tests described below.

| | | | | All Filters Must Meet the Following Dimensions |
|---|---|---|---|---|
| Characteristic | No. of Filters | Test/Analysis Method (Reference Number) | Maximum | Minimum |
| Length, Width | 50 | Rule, Graduated to 1/16" divisions, or suitable template | 8"+1/16"<br>10"+1/16" | 8"-1/16"<br>10"-1/16" |
| Thickness | 75 | ASTM Method D645-92 | 0.60 mm | 0.30 mm |
| Brittleness | 50 | Brittleness Test for Fiber Filters | No crack larger than one inch | |
| Tensile Strength | 75 | ASTM Method D828-93 | None | 500 g |
| Flow Rate | 75 | EPA Flow Rate Acceptance Test | 1.80 $m^3$/min | 1.34 $m^3$/min |
| Retention | 50 | ASTM Method D2986-91 | None | 99.95% |
| Visual | 525 | AREAL visual Inspection Test Procedure<br>a. Defect Filters<br>b. Reject Filters | <br><br><br>20%<br>5% | <br><br><br>None<br>None |

B. Chemical Properties:

(1) Weight Loss. No filter from a total of 50 filters tested shall lose more than 0.75% of its weight when tested for weight loss on heating as per the NERL's procedure entitled

Determination of Organic Content of Quartz and Glass Fiber Filters.

(2) Lead Content. No filter from a total of 50 filters shall contain more than 0.25 micrograms of lead when the filter is analyzed as per the EPA Reference Test Method for Lead 40 CFR 50.

## IV. Chemical and Physical Characteristics for Quartz Fiber Filters

A. Physical Properties

500 filters from each batch of quartz fiber filters, where a batch is defined as the filters to be used in one calendar year, shall be selected for acceptance testing by the physical and chemical tests described below. All filters shall be subjected to the visual inspection test and then a certain number shall be subject to the other tests described below.

| | | | All Filters Must Meet the Following Dimensions | |
|---|---|---|---|---|
| Characteristic | No. of Filters | Test/Analysis Method (Reference Number) | Maximum | Minimum |
| Length, Width | 50 | Rule, Graduated to 1/16" divisions, or suitable template | 8"+1/16" 10"+1/16" | 8"-1/16" 10"-1/16" |
| Thickness | 75 | ASTM Method D645-92 | 0.60 mm | 0.30 mm |
| Brittleness | 50 | Brittleness Test for Fiber Filters | No crack larger than one inch | |
| Integrity | 50 | Test for Integrity of Fiber Filters | <2.5 mg | None |
| Tensile Strength | 75 | ASTM Method D828-93 | None | 200 g |
| Flow Rate | 75 | EPA Flow Rate Acceptance Test (EMSL/RTP) | 1.80 $m^3$/min | 1.34 $m^3$/min |

| | | | All Filters Must Meet the Following Dimensions | |
|---|---|---|---|---|
| Characteristic | No. of Filters | Test/Analysis Method (Reference Number) | Maximum | Minimum |
| Retention | 50 | ASTM Method D2986-91 | None | 99.95% |
| Visual | 475 | AREAL Visual Inspection Test Procedure<br>a. Defect Filters<br>b. Reject Filters | <br><br>20%<br>5% | <br><br>None<br>None |

B. Chemical Properties

Weight Loss. No filter from a total of 50 filters tested shall lose more than 0.75% of its weight when tested for weight loss on heating as per the AREAL's procedure entitled "Determination of Organic Content of Glass Fiber Filters (EMSL/RTP-SOP-QAD-522).